On the Formation of the Zhedong Canal during the Pre-Qin and Qin-Han Periods

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Abstract. The natural environment of the Ningshao Plain, which is surrounded by mountains and faces the sea, and the terrain of high south and low north, determined the inevitability of the development of water transportation in the region. Based on this, local water conservancy development had existed for a long time. The Zhedong Canal, which originated from the comprehensive engineering of the Shanyin ancient waterway constructed by the State of Yue in the late Spring and Autumn period, was further developed with the opening of the ancient Jiangnan Canal after the unification of Qin. During the Eastern Han Dynasty, the Jian Lake system was constructed, followed by the successive development of the Westward Canal during the Six Dynasties. Thus, the complete picture of the Zhedong Canal, as known today, gradually took shape. Based on the analysis of the engineering projects throughout the dynasties, it is evident that the formation of the Zhedong Canal was not accomplished overnight nor based on a single foundation. Its functional design was not limited to transportation alone. The superimposition of engineering projects across different periods revealed the canal's development as being adaptive to the times and innovative in nature. This objectively reflects the historical choice of Chinese ancestors to proactively adapt to nature and transform the environment.

Keywords: Shanyin Ancient Waterway; Ancient Jiangnan Canal; Jian Lake; Zhedong Canal; Water Conservancy.

1. Introduction

As an important component of China's Grand Canal, a world cultural heritage site, the research and documentation of the development and evolution of the Zhedong Canal has become particularly important and urgent. Currently, the academic community has already taken notice of this matter. For example, in his book "The History of Canal Development in China," Mr. Chen Qiaoyi has sorted out the evolution of the Zhedong Canal. Additionally, scholars such as Chen Zhifu and Chen Zhigen have conducted research on the changes in certain sections of the Zhedong Canal since the Song Dynasty. In general, however, there are still a lot of research gaps in this area. In order to clarify the formation of this canal, this paper intends to start with the water conservancy development in Zhedong during the pre-Qin and Qin-Han periods. Based on the iterative analysis of engineering construction, the process and fundamental reasons for the formation of the Zhedong Canal will be further explored.

2. Prehistoric Water Environment and the Emergence of Navigation in the Land of Yue

Research indicates that since the late Quaternary period, the natural world has experienced three drastic changes in geographic environments. [1] The marine transgression caused by the foraminifera invasion 6,000 to 7,000 years ago turned the Ningshao Plain in Zhedong into a shallow sea. [2] After the marine regression, the Yue people relied on the abundance of mountains and forests, as well as the benefits of the ocean, to begin to thrive on the limited plains. Objective evidence of the activities of ancient Yue people can be seen at the Xiaoshan Kua Huqiao site and the Hemudu Cultural Site in Yuyao. In the daily migration and movement, the Yue people had to cross rivers and seas, which naturally involved transportation issues. This led to the emergence of water transportation. According to The Book of Yue Jue [3], the Yue people "used boats as vehicles and oars as horses" [4], indicating frequent water transportation. According to the principle of "object determines tool", the discovery

of the single-log canoe on the Kua Lake Bridge undoubtedly indicates that the ancient Yue people began to make boats and develop navigation at least 8000 years ago. [5] Moreover, wooden boat paddles [6] and single-log canoe remains [7] have been found at the Hemudu Site, as well as pottery boats modeled after single-log canoes [8]. These provide strong evidence for the emergence of early navigation. It is worth noting that for the ancestors, how to benefit from water and avoid its harm has always been a problem they had to face. Scholars have pointed out that the Hemudu ancestors had an early awareness of water conservancy and even invented primitive irrigation and drainage canals to develop rice agriculture. [9] If this viewpoint is valid, it is not difficult to infer that an artificial water network of a certain scale had already been formed at that time. With boats and oars, there naturally came the "benefits of boats and oars". In the process of adapting to and transforming nature, the Yue people further expanded their range of activities, strengthened their connections with the outside world, "promoted cultural exchange and production development, and had a profound impact on the Yue people's future water transportation, way of life, and military warfare" [10].

3. Excavation of the Shanyin Ancient Waterway in the State of Yue

The ancient Zhedong area was described by Li Daoyuan of the Northern Wei Dynasty as a region where "countless streams converge, waves overflow the lakes, the ground becomes rivers, and branches and ferries intersect" [11]. The Book of Yue Jue describes the natural geography of the Yue region, which is characterized by riverside and coastal areas, numerous lakes, and hills that are "interlaced and overlapping, with turbulent waves and deep currents, sinking and rising, and returning back and forth" [4]. This record reflects the fact that the mountains and rivers of Kuaiji to the north of the Shan-Hui Plain flow downstream, while the surge of the Qiantang River floods the plain and meets the mountains, causing floods and inundations, creating a vast wetland.

As the Geographical Records of the Book of Han Dynasty, "Jiangnan is humid and wet, so many men die young" [12]. The Yue people could only "shave their hair and tattoo their bodies to avoid the harm of dragons and serpents" [12]. This primitive custom undoubtedly reflects the harsh living environment of the time. However, faced with this "low and humid" environment, the Yue people were not afraid of danger. Instead, they chose to forge ahead and claim land from the sea, constantly expanding their living space. With the popularization of agriculture, the Yue people developed a basic production system based on "bird fields" [12] and implemented an agricultural development model of controlling tides and storing fresh water by building embankments. They constructed a series of water conservancy facilities, such as Fuzhong Datang, Kuzhucheng, Liantang, and Wutang, to support their agricultural production. [12] In addition to building embankments, the Yue people also reformed the water network system, using artificial channels to connect the north-south water flow on the mountainous plain, thereby forming a continuous east-west waterway for transportation. According to the "Biography of Goujian" in the "Records of the Grand Historian," in the sixth year of Goujian's reign (491 BC), he accepted Fan Li's proposal to "establish the capital in an unconquerable location and occupy the surrounding territories, rather than in an easily accessible location, and control the four directions" as a means of seeking revenge. [13] The following year, Goujian moved the capital from Pingyang (now Pingshui Town) to the southern foot of Zhongshan in Shaoxing, where he established the small city of Goujian. Soon after, the Shanyin Grand City was built outside the small city. Fan Li designed four water gates for both the small and grand cities, demonstrating the advanced water transportation system of that time. Later, for the purpose of transporting goods and troops, King Goujian extended the east-west waterway, which was named the Shanyin Ancient Waterway. [10] According to Volume 8 of The Book of Yue Jue, "The Shanyin Ancient Waterway, which starts from the eastern gate and passes through the Yangchun Pavilion in the county, is fifty li away." [4] Mr. Chen Qiaoyi, a scholar specializing in the study of the Grand Canal, pointed out that this is currently the earliest record of the Shanyin Ancient Waterway. [14] The Shanyin Ancient Waterway and the ancient road coexisted, starting from Liantang at that time, passing through the Yangchun Pavilion and the eastern gate of Shanyin City (now Shaoxing City),

and then passing through the southern edge of the city along the river outside the Pianmen Gate, reaching Keyan, Bin She, and Qianqing, crossing the Xixiaojiang River to Guling (now Xixing), and reaching the Qiantang River, spanning the entire Shanhui Plain. [15] It connected the capital city of "Goujian Small City" and "Shanyin Grand City" with the metallurgical and military industrial base of Liantang and the food production base of Fuzhong Datang. [4] The "Dongguo" and "Yangchun Pavilion" mentioned in The Book of Yue Jue should both be located by the canal on the east side of present-day Shaoxing city. The Dongguo Gate was located on the east side of the former Yanqing Temple, at the junction of Luxun East Road and Huancheng East Road, southeast of the city. It is the starting point of the Shaoxing Shanyin ancient waterway. Liantang, like the "Fuzhong Datang" mentioned earlier, is also a tidal barrier for storing fresh water and irrigating farmland. According to existing literature, the construction of the Shanyin ancient waterway was mainly concentrated in the east of Shaoxing city, but the Yue state should have also constructed some natural waterways in the western part of the Shanhuiping Plain (now within Xiaoshan). The following analysis will mainly focus on Guling in present-day Xiaoshan. Guling, located near the Xianghu Lake in Xiaoshan, was an important ferry crossing for the Yue state. According to Li Daoyuan's The Water Classic, "Zhejiang also has a waterway passing through the north of Guling City. In the past, Fan Li built a city on the bank of the Zhejiang River, saying that it could be defended, and named it Guling. It is now called Xiling." [10] (See Figure 1) Chen Zhifu believes that "Guling is located at the Yuezhang Mountain of the Yue King's City" [16] , and there are different opinions among modern scholars. The Yuezhang Mountain, located north of Wenyan Town in Xiaoshan, is the site of the Yue King's City, which is designated as a provincial-level key cultural relic protection unit and situated on the mountaintop. According to the "Shaoxing Prefecture Annals" written in the Qianlong period, "Yuewang Mountain, also known as Yuewang Zheng or Qishan, has the sites of Zoumagang, Foubing Road, Ximachi, and Zhigeng Tower on the top." [17] In 1991, the Zhejiang Provincial Institute of Cultural Relics and Archaeology and the Xiaoshan Municipal Cultural Relics Management Committee conducted a joint excavation of the city wall, and excavated a batch of relics from the Spring and Autumn and Warring States periods, confirming the nature of the site. [18] This important archaeological discovery confirms the record of Li Daoyuan's investigation that "Fan Li built a city on the coast of Zhejiang" [10]. The Yuezhang Mountain should be the castle ruins of the period when the Yue King Goujian "fortified Ling in the military camp", but whether it is the real Guling remains uncertain. It can be confirmed that the castle on the Yuezhang Mountain and Guling are located near the Xianghu Lake in Xiaoshan today. Due to the Qiantang River being a natural barrier and the surrounding mountains being difficult to traverse, the Yue State used this as a naval base and a dock to connect to the north bank of the Qiantang River, and named it Guling because it was easy to defend and difficult to attack. "The Annals of Wu and Yue" records that "In the fifth year of King Goujian of Yue (492 BC) in May, he and the ministers Zhong and Fan entered Wu as envoys. All the ministers accompanied them to the upper reaches of the Zhejiang River, which was near the Ancestral Waterway, and the troops defended the Guling dock. " [13] Goujian bid farewell to his troops at Guling and traveled upstream by boat. Therefore, there should be an east-west waterway from Shaoxing City to Guling. Due to the natural geographical environment of the Ningshao Plain, most of the natural river channels run north-south. As a result, this east-west waterway must have been artificially constructed. This waterway should also be connected to the Shanyin ancient waterway. According to Mr. Qiu Zhirong's research, the Shanyin ancient waterway was not only located in the eastern part of Shaoxing City, but it should have already been connected to the east and west of the Xiaoshao Plain and existed before the Spring and Autumn period. King Goujian of Yue only cleared and improved it, making it a complete waterway. [10] It could even connect to areas north of the Yangtze River. Therefore, the Shanyin ancient waterway can be regarded as one of the earliest artificial canals still in existence in China.

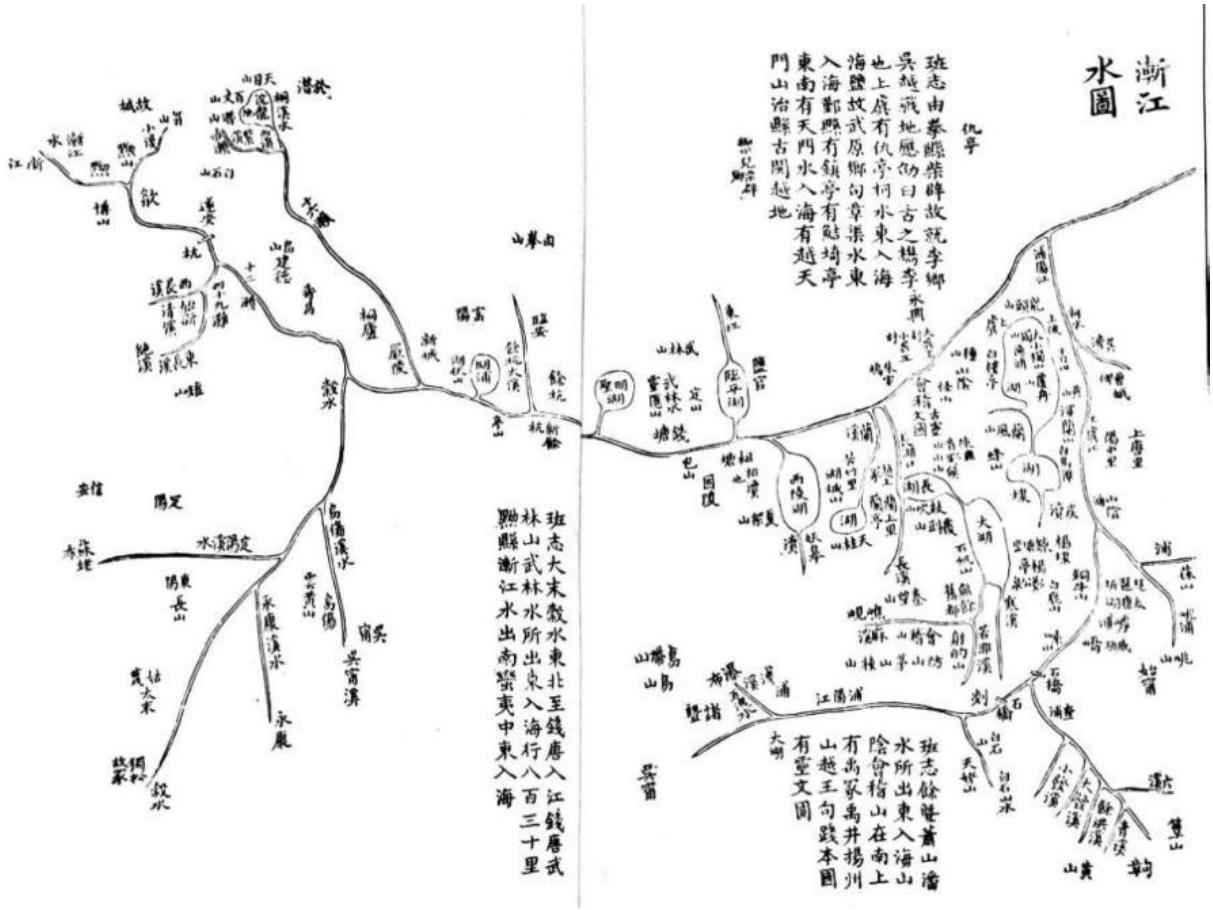


Figure 1. Map of "Jianjiang River" from Illustrated Commentary on the Water Classic

As a comprehensive water conservancy project, the Shanyin ancient waterway not only had the functions of navigation and irrigation, but also had the effect of preventing tidal waves and floods. Its construction was of great significance. For one thing, the Shanyin ancient waterway, as an east-west artificial waterway, effectively strengthened the connection of the core area of the Yue State. For another, King Goujian could effectively control the Shanhuiping Plain through this project. These factors played a positive role in the rise of the Yue State.

4. Development of the Ancient Jiangnan Canal during the Qin Dynasty

In the 25th year of King Zheng of Qin (222 BC), Qin established Kuaiji County, which unified the former territory of the Yue State. After the unification of the six kingdoms, Emperor Qin Shi Huang renamed the Great Yue as Shanyin in the east. [4] He then relocated the convicted officials and common people from all over the country to the former Great Yue in Hainan to prepare for the Yue people outside the East China Sea, and renamed the Great Yue as Shanyin. [4] Due to the remote location of the Yue region from the capital, the central government has always had weak control over it. Additionally, a prophecy by a Taoist master stated that "five hundred years later, Jinling will have the atmosphere of a metropolis." [19] This forced Emperor Qin to resort to imperial tours as a means to exert his authority and suppress any potential rebellions.

The year after the establishment of Kuaiji Commandery by the Qin Dynasty (in 221 BCE), its western region was separated to form Zhang Commandery. [20] According to Geographical Records of the Book of Han Dynasty, Kuaiji Commandery governed 26 counties, including Yuyao, Yangxian, Zhuji, Wuxi, Shanyin, Dantu, Yuyao, Lou, Shangyu, Haiyan, Shan, Youquan, Damo, Wucheng, Juzhang, Yuhang, Yin, Mao, Fuchun, Ye, and Huipu. [12] During the Han Dynasty, Kuaiji Commandery's jurisdiction included both the Yue region from the Spring and Autumn period and the Wu region. Regarding the difference between Wu and Yue, the volume ten of “The Geography of the

Outer Records of Yue Jue" of The Book of Yue Jue states: " In the Yuerxiang area, which is the former boundary of Yue, there is a place called Jiuli. The Wu and Yue territories were battlefields, extending to Chaipi Pavilion... The boundary of the Great Yue reached Zhejiang to Jiuli, and to the south were Gumo and Xiegan." [4] Jiuli, mentioned earlier, is the site of the 19th year of the reign of King Helu of Wu's invasion of Yue, as recorded in "The Annals of Wu Taibo" in "The Records of the Grand Historian". In the "Upper Discourse on Yue" of the "Discourses of the States", it is stated that Goujian's territory was "broadly extended for a hundred li" and "extended to Juwu in the south, Yuer in the north, Yin in the east, and Gumei in the west." Among them, Juwu (the northern boundary of Yue) is located in the Jiaxing area today, and Chaipi Pavilion is located in Tongxiang, Jiaxing. [21] Based on this, it can be inferred that during the late Spring and Autumn period, the border between Wu and Yue was roughly located at Zaoli and Chaipi Pavilion north of Zhejiang, which is the line of Jiaxing today. During the period of Wu-Yue struggle for hegemony, the Wu capital Gusu once dug a waterway connecting the Yangtze River, as recorded in The Book of Yue Jue: "The ancient waterway of Wu, starting from the Pingmen, passing through the Kuochi, entering the Du, passing through the Chaohu, passing through the Lidi, passing through the Meiting, entering the Yanghu, passing through the Yupu, entering the Yangtze River, and arriving at Guangling." [4]

Liao Zhihao and others believe that in the first year of King Fuchai of Wu (495 BCE), a large number of water workers were mobilized to excavate a canal in the northwest of Suzhou, which connected to the Yangtze River. [22] It can be inferred from this that the northern section of the Jiangnan Canal was already constructed by the Wu people and extended to Danyang before the unification of Qin. In order to understand the situation of Wu, the Yue people also constructed the "Baichi Du" at the northeastern foot of Hangwu Mountain , which was located on the northeast side of the Hangzhou Bay in Xiaoshan Hezhuang Mountain (Hezhuang Mountain was originally located southwest of Yanguan Town in Haining City on the north bank of the Qiantang River). The Baichi Du canal should have been connected to the main waterway of Yue State and provided extremely convenient water transportation. According to the research of Wei Songshan and Wang Wenchu, the route taken by Goujian in his campaign against Wu during the Battle of Fu Chai should have gone from Baichi Du northwards to Chongde County, and then followed the present-day Jiangnan Canal to reach Songjiang and Taihu Lake. [23] The Wu Gu Waterway, consistent with the Shanyin Ancient Waterway, was an important transportation route for both states. Yue State could navigate around Wuhu Mountain from Baichi Ditch and ultimately reach Yangzhou, which was the situation for navigation from the Shanyin Ancient Waterway to the north of the Yangtze River at that time. In short, during the process of mutual warfare and communication between Wu and Yue, the two states successively developed and improved their main artificial waterways, which laid an important foundation for the development of the ancient Jiangnan River in the Qin Dynasty. To consolidate his rule and facilitate his eastern inspection tour, Qin Shihuang carried out rectification of rivers, canals, and roads in this area. Records of the Historian records Qin Shihuang's route and activities from Yunmeng to Mount Kuaiji in Zhejiang as follows: "He observed Jike, crossed Haizhu, passed Danyang, arrived at Qiantang, and came to the Zhejiang River, where the water was turbulent. He then crossed the narrow passage 120 li to the west. He arrived at Mount Kuaiji, where he offered sacrifices to Dayu, looked out at the South China Sea, and had an inscription carved to praise the virtues of the Qin dynasty." [24] The route of Qin Shihuang's eastern inspection tour recorded in the Annals of Qin Shihuang in Records of the Historian also reflects the geographical features of Zhejiang as the boundary between Wu and Yue: "The water was turbulent, so he crossed the narrow passage 120 li to the west." [24] This "narrow passage" that spans "120 li" should be advancing in the direction of Danyang, arriving at Qiantang on the north bank of the Zhejiang River. Due to strong winds and waves, they were unable to cross, so they took the road to the west of Yuhang. [11] After the first emperor of Qin, Qin Shihuang, entered the Yue territory from the Wu territory and arrived at the Shanhuiping Plain, he probably conducted an inspection of this area along the line of the Shanyin Ancient Waterway or the ancient land route, which demonstrates that the Shanyin Ancient Waterway, which ran from Liantang to Guling in the east, had formed a considerable scale of waterway at that

time. After Qin Shihuang returned from Kuaiji to Qiantang, he took the route through the Wu region and "crossed Wu and crossed the river by ferry." [24] The Book of Yue Jue records: "When they arrived in Wu, they went up to the Gusu Terrace, then built the Shafang at the north of the Zhaoting and Jiating, and each year they went to Lingbu and did not leave until they had performed the ritual. They played the Qu'a music and crossed the Niuzhu." [4] The Book of Yue Jue records that Qin Shihuang's southern route was from Danyang, Liyang, and Zanggu to the south of Keting in Yuhang, which was mainly located in Zang County west of Taihu Lake. His northern route was from Qiantang to Wu, then to Qu'a and Juru, which was located in Kuaiji County east of Taihu Lake. At that time, Qin Shihuang was returning to the Wu region, "Qin Shihuang sent troops to guard the Ling Road south of Gaotongling." [4] This shows that the Ling Road built by Qin Shihuang was actually constructed in the Wu region east of Taihu Lake in Kuaiji County and north of Zhejiang, mainly for his return journey. Regarding the route of the Ling Road in Kuaiji, The Book of Yue Jue also records: "Qin Shihuang built the Ling Road south, which could connect to the Ling Road, and arrived at Youquan Pass. It started from Matang and was obstructed by Zhanbei. The Ling waterway was constructed to Qiantang and the Yue territory, connecting to the Zhejiang River." [4]

According to The Water Classic on the Mian River, we can learn that Emperor Qin Shihuang constructed and excavated two direct passages to Qiantang and Yue by water and land. In order to ensure sufficient water supply for this funerary passage and facilitate navigation, "Ma Tang was built and Zhan was used as a reservoir" by utilizing the lake to store water. After the excavation and navigation of the waterway, it greatly promoted the development of water transportation between the states of Wu and Yue. During his eastern tour, Emperor Qin Shi Huang connected the waterway from Jiaxing to Hangzhou, laying the basic route of the Jiangnan Canal that runs from Zhenjiang in Jiangsu Province, through Danyang, Suzhou, Jiaxing in Zhejiang Province, and all the way to Hangzhou, connecting the Yangtze River and the Qiantang River. At this point, the Jiangnan Canal had begun to take shape.

5. Construction of Water Conservancy Project of the Jian Lake during the Eastern Han Dynasty

After the defeat of Wu, King Goujian relocated his capital to Langya. [25] The relocation resulted in the departure of a large portion of the military and tribal residents, causing a sharp decline in population in the original Yue territory. In the 37th year of Emperor Qin Shi Huang's reign (211 BC), "the people of Dai Yue were moved to Yuhang and Yizhang to attack the former Chang. [24] In addition, the criminals and exiled officials and people from all over the country were moved to the former Dai Viet in Hainan to prepare for the eastern Yue beyond the East China Sea" [24] In addition, "all the areas south of Wucheng, Yuhang, You, She, Wuhu, and Shicheng counties were inhabited by the relocated Dai Yue people" . The Yue people settled in the northwestern part of present-day Zhejiang and the southeastern part of Anhui, which was close to the Wu territory, with the aim of controlling and consolidating their power. At that time, the Dai Yue residents who refused to accept the forced relocation scattered to the south, leading to a sharp decline in population. After arriving in Kuaiji, Sima Qian bluntly stated that the region had "a vast land and sparse population" [24] Compared to the Central Plains region, the water conservancy construction during the Western Han Dynasty had limited achievements in the mountainous and plain areas.

Although the Kuaiji region had a vast plain area during the Western Han Dynasty, its actual production and living conditions were severely constrained by natural conditions. The southern part was a continuous mountain range, while the northern part was a vast plain, and north of the plain was the mouth of the Qiantang River. Under such terrain and geographical conditions, the Shanhui Plain often became a swamp during flash floods or extreme tides. If the seawater surged, the people would have no means of livelihood. To develop the economy and prosper society, the agricultural form in the Yue territory urgently needed to be transformed. Therefore, in the fifth year of the Yonghe reign (140 AD), Ma Zhen began the construction of Jian Lake. During the Eastern Han Dynasty, Ma Zhen,

the governor of Kuaiji Commandery, constructed dikes and dams in the area north of the alluvial fan in front of the mountains of the Shanhui Plain. The water from the "Thirty-Six Springs" flowing out of the hilly areas was collected south of the dikes and dams, forming Jian Lake. The Water Classic Annotation Jian River Water states, "There are sixty-nine water gates along the lake" [11], indicating the immense scale of the construction of Jian Lake. The construction of Jian Lake made full use of the natural terraced terrain of the Shanhui Plain, with higher elevations in the south and lower elevations in the north. Water control facilities, such as sluices and weirs, were used to distribute and regulate water resources within the region. Due to the damming of the lake embankment, the water level of Jian Lake was higher than that of the northern plain, and the lake water could flow downstream through channels to irrigate the farmland in the north. It could also resist the intrusion of seawater, and during flood seasons, such as sudden heavy rainfall, the excess water could be discharged into the sea. As recorded in the "Records of Kuaiji", "Jian Lake was built with embankments to store water, with a height of more than ten zhang. The farmland was also raised to more than one hundred zhang above sea level. If there was little water, the lake water would be released to irrigate the farmland. If there was too much water, the lake would be opened to drain the excess water into the sea, ensuring that there were no bad harvest years. The embankment around the lake was three hundred and ten li in circumference, irrigating more than nine thousand hectares of farmland" [26] In terms of transportation, the embankment of Jian Lake also raised the water level of the rivers in the northern mountainous area of Kuaiji, greatly facilitating water transportation in the southern alluvial fan area. In the historical literature of various dynasties, Jian Lake has always been one of the main waterways for shipping in eastern Zhejiang. "Zhejiang is located in the northeast, and it reaches Changhu Port. The lake is five li wide and the distance from east to west is one hundred and thirty li. There are sixty-nine water gates along the lake, irrigating ten thousand hectares of farmland and flowing northward to the Yangtze River". [11] This Jian Lake, which stretches for one hundred and thirty li from east to west, had an extremely important shipping position in the Shanhui Plain and eastern Zhejiang region. As Mr. Qiu Zhirong pointed out, although the shipping route in the west (Shanyin County) was later replaced by the Xixing Canal, the shipping route in the east (Kuaiji County) still roughly followed the Jian Lake water system and continued to modern times.

Based on field research, the western end of Jian Lake is located at Guangling Bridge in Hu Xiang Village of Qianqing Town today. During the Eastern Han Dynasty, this area was a hydraulic facility called Guangling Doumen, which was very close to the Xi Xiaojiang that was connected to Shanyin Ancient Waterway. According to research conducted at Chenqiao Yi, the north embankment of Jian Lake is basically consistent with the Shanyin Ancient Waterway. The north embankment of Jian Lake was reinforced and raised on the basis of the original ancient canal embankment, and the culvert facilities were improved and completed. [10] According to the "Transportation Annals of Shaoxing City," the northwest main channel in the ancient waterway of Yue State "connected the capitals of the two states of Yue and Wu." [27] In the diagram in the book, the land route from Dayue to Guling is basically consistent with the Jian Lake embankment line depicted in later Tang and Song Dynasty diagrams of the ancient waterway. [15] (See Figures 2 and 3.) All of the above can prove that the Jian Lake project was formed on the basis of the Shanyin Ancient Waterway through comprehensive construction.

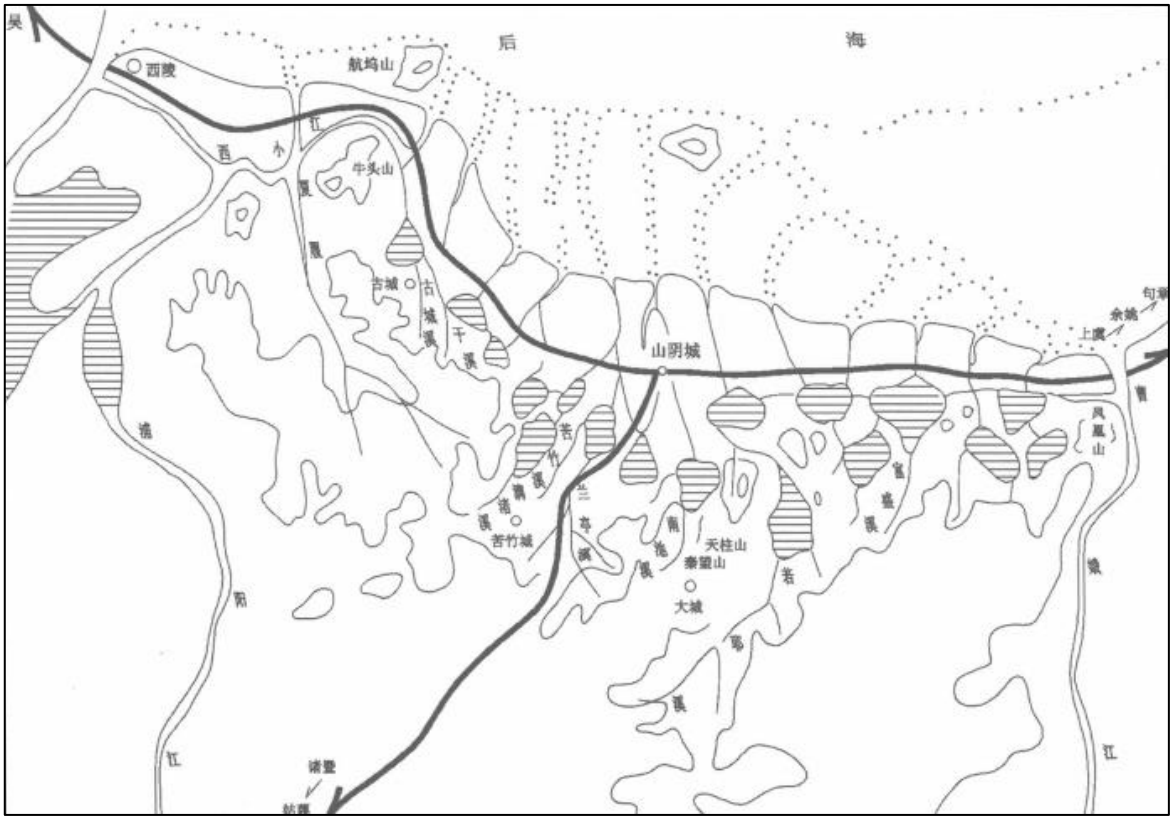


Figure 2. Transportation Diagram of Shanhuiping Plain during the Spring and Autumn Period and Warring States Period. [15]

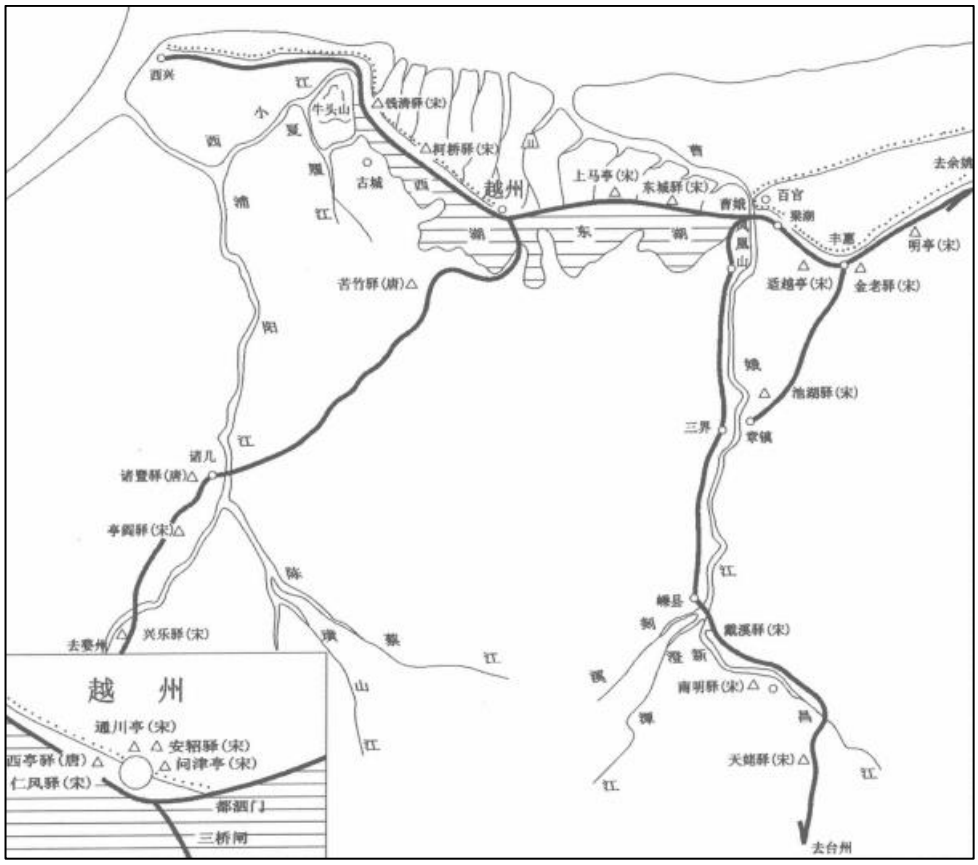


Figure 3. Water and Land Transportation Diagram of Shanhuiping Plain during the Tang and Song Dynasties.[15]

After the Northern and Southern Dynasties, the water conservancy of Jian Lake continued to develop, which improved the economic and political status of the Shanhuiping Plain region. The new situation presented a new mission: during the Western Jin Dynasty, He Xun, the Interior Minister of Kuaiji, built the Xixing Canal, which was basically parallel to the Jian Lake embankment. It crossed the Xi Xiaojiang and turned northward, then headed west after Yaqian and ended at Xiling by the Qiantang River. This canal connected Jian Lake and formed a systematic irrigation network, which laid the foundation for the formation of the Zhedong Canal. During the Tang Dynasty, the shipping status of the canal became even more prominent. The prosperity of the canal greatly promoted the local economic and social development. "There were no peers in the world, except for those who came from Suzhou and Hangzhou." This vividly illustrates the scene of local economic prosperity. In the third year of Jianyan (1129), Emperor Gaozong of the Song Dynasty traveled from Hangzhou to Yuezhou via the Zhedong Canal and stayed in Zhoudi. This marked the beginning of the Song Dynasty's regulation and dredging of the Zhedong Canal. "People from all over the country gathered in the two Zhejiang provinces, and the population increased by a hundredfold compared to normal times." [28] Mr. Chenqiao Yi believed that the Zhedong Canal during the Southern Song Dynasty could be regarded as an "international main waterway." [15]

Looking back on the history of the development of the Zhedong Canal throughout the dynasties, the purpose of canal construction changed after the Qin Dynasty compared to the pre-Qin and Qin periods. Canal construction during the pre-Qin and Qin periods was more military and political in nature, while canal projects from the Han Dynasty onwards tended to serve local agricultural production and economic development.



Figure 4. Photograph taken by the present writer in Xixing Canal Ancient Town on February, 2023

6. Conclusion

The formation of the Zhedong Canal went through a long process. Regarding how the canal was formed in the Shanhuiping Plain, Wang Shixing of the Ming Dynasty believed that "this was originally a marshland, with only a small amount of water. People settled wherever there were sandbars formed by the rising water, hence the name 'people in Yanlu.' Over time, the residents either transported soil to level the land, or built embankments and dug canals for irrigation, or dredged ports and harbors for water transportation. Over time, with the joint efforts of many people, the river gradually took shape, the embankments were built, and the bridges, streets, and markets gradually decorated the area," [29] which reflected the objective laws of the changes in ancient waterways in the city of Shaoxing and also provides some inspiration for the understanding of the evolution of the Zhedong Canal. This paper reviewed the natural environment of the early formation of the Zhedong Canal and the early shipping situation of the Yue people. Then, the canal water conservancy projects of the Shanyin Ancient Waterway, the Ancient Jiangnan River, and Jian Lake were sorted in chronological order. It is important to emphasize that the predecessor of the Zhedong Canal was not actually a fixed canal, but was initially formed by multiple segmented water conservancy projects that were superimposed over time. After thousands of years, the Zhedong Canal finally took on its present appearance.

Throughout the key period from pre-Qin to Qin-Han dynasty, the political and military functions of the Zhedong Canal gradually weakened while its economic and livelihood functions significantly strengthened. Initially constructed to improve navigation conditions in the Yue region, Shanyin ancient waterway's primary function was for transportation. During the reign of King Goujian of Yue, the construction of the canal had a strong political and military purpose due to the need for external warfare. During the reign of Emperor Qin Shihuang, the renovation and excavation of the ancient Jiangnan River also aimed to strengthen political control, with a strong political color. After the Eastern Han period, the political and military aspects of the canal project faded, while economic and livelihood aspects strengthened. This change can be attributed to the degree of development and economic productivity in the Yue region. During the Spring and Autumn period, the Zhedong region was a barren land in the southeast corner. However, from the Eastern Han period to the Southern

Dynasties, the economic important of the Zhedong region was self-evident, and the functions of the canal had changed accordingly.

In summary, the formation of the Zhedong Canal is an extremely grand issue that deserves continuous exploration.

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